Lawrence Livermore National Laboratory

Environmental Protection Implementation Plan

(November 9, 1994 - November 9, 1995)

October 1994

Lawrence Livermore National Laboratory
University of California

DOE-OAK Operations Office

List of Contributors to EPIP

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1.0 General Description of LLNL's Environmental Protection Program

U. S. Department of Energy (DOE) Order 5400.1, *General Environmental Protection Program*,[1] establishes Environmental Protection Program requirements, authorities, and responsibilities to ensure that DOE operations are in compliance with applicable federal, state, and local environmental protection laws and regulations, Executive Orders, and internal DOE policies. This 1994–1995 *Environmental Protection Implementation Plan* (EPIP)[2] describes how Lawrence Livermore National Laboratory (LLNL) complies with that Order in conducting its environmental protection programs under the direction of the DOE Oakland Operations Office (DOE-OAK) and facilitates DOE's evaluation of LLNL's environmental programs.

1.1 LLNL MANAGEMENT COMMITMENT TO ENVIRONMENTAL PROTECTION

LLNL has long maintained a strong environmental compliance program as well as a diverse environmental research and development focus. This year, to fully facilitate LLNL's ability to coordinate and support the growing LLNL environmental research and development effort, LLNL instituted a new Environmental Programs Directorate. Most of the Laboratory's broad-based environmental research, development, and demonstration projects were consolidated into this new organization. The activities of the new directorate extend from basic research in geological, atmospheric, and environmental phenomena to applied research and pilot-scale testing of technologies for environmental remediation and waste management. The directorate's projects draw on expertise from across the Laboratory in areas such as microbiology, laser technology, engineering, computer science, chemistry, and nuclear physics. The products include policy guidance and model and technology development across many disciplines, environmental remediation technologies, hazards mitigation and emergency assistance, and basic research.

However, to best serve LLNL's current environmental, safety, and health (ES&H) compliance needs, LLNL retained responsibility for environmental protection and compliance in ongoing ES&H programs within the existing Plant Operations Directorate.

As stated in LLNL's Environmental Policy (see **Appendix A**), LLNL focuses on meeting or exceeding environmental compliance requirements. In accordance with that policy, it is also the policy of LLNL to operate all facilities and programs in a manner that keeps impacts to worker health, public health, and the environment as low as reasonably achievable. This policy, known as ALARA, is documented in LLNL's *Health and Safety Manual,*[3] Chapters 1, 2, and 33, as well as in Supplement 33.01. Individual facilities

document their ALARA goals and programs in Facility Safety Procedures (FSPs), as needed. In addition, LLNL will add further ALARA information in the Environmental Radiological Protection Program Plan that will be required when the *Code of Federal Regulations* (CFR), Title 10, Section 834 (10CFR834),[4] is promulgated.

Environmental concerns are addressed as part of LLNL's overall ES&H programs. The general LLNL management structure that carries out environmental protection work is described in this chapter. Although the LLNL Director's Office is currently completing a reorganization, and that reorganization will somewhat alter the existing roles, responsibilities, and authorities, the fundamental hierarchy of responsibilities associated with line management, staff, and support groups, as described in this document, is not expected to change. A draft document is currently in the final stages of preparation. "The Environmental, Safety and Health Program at the Lawrence Livermore National Laboratory" reflects changes in organizational structure and responsibility during the past year and those changes that are currently underway. The documents, *Environmental, Safety, and Health Management at LLNL*[5] and *Roles, Responsibilities & Authorities for Environment, Safety & Health at LLNL,* also delineate LLNL environmental management structure from the Director through the organization and can be referenced for additional information, but they do not reflect the more recent changes. The following summarizes the ES&H structure as it is currently organized and as it is anticipated it will be organized in the coming year.

The Director of LLNL manages and is accountable for all Laboratory operations and activities, including ES&H. The Director establishes Laboratory policy. Accordingly, the Director has issued policy statements in the areas of safety and the environment and ensures the implementation and overall effectiveness of the Laboratory's ES&H programs. The Director holds the Associate Directors (ADs) accountable for implementing LLNL ES&H policies as an integral part of their management responsibilities.

From the ADs, responsibility for implementing these policies flows to the managers and then to the individual workers performing the tasks. Coordination and consistency in the details of ES&H policies across the directorates are provided through a Senior Management Council (SMC), an ES&H Working Group, and subcommittees of the ES&H Working Group that coordinate specific program responsibilities and general institutional accountability. **Exhibit 1-1** illustrates the general LLNL organization for managing ES&H responsibility. It shows the line of responsibility flowing from the Director to the ADs and continuing down through the program elements. Some of the committees and key staff who help coordinate and oversee the overall program are also shown. The general responsibilities and authorities of each of the key positions are described below.

1.2 LINE MANAGEMENT

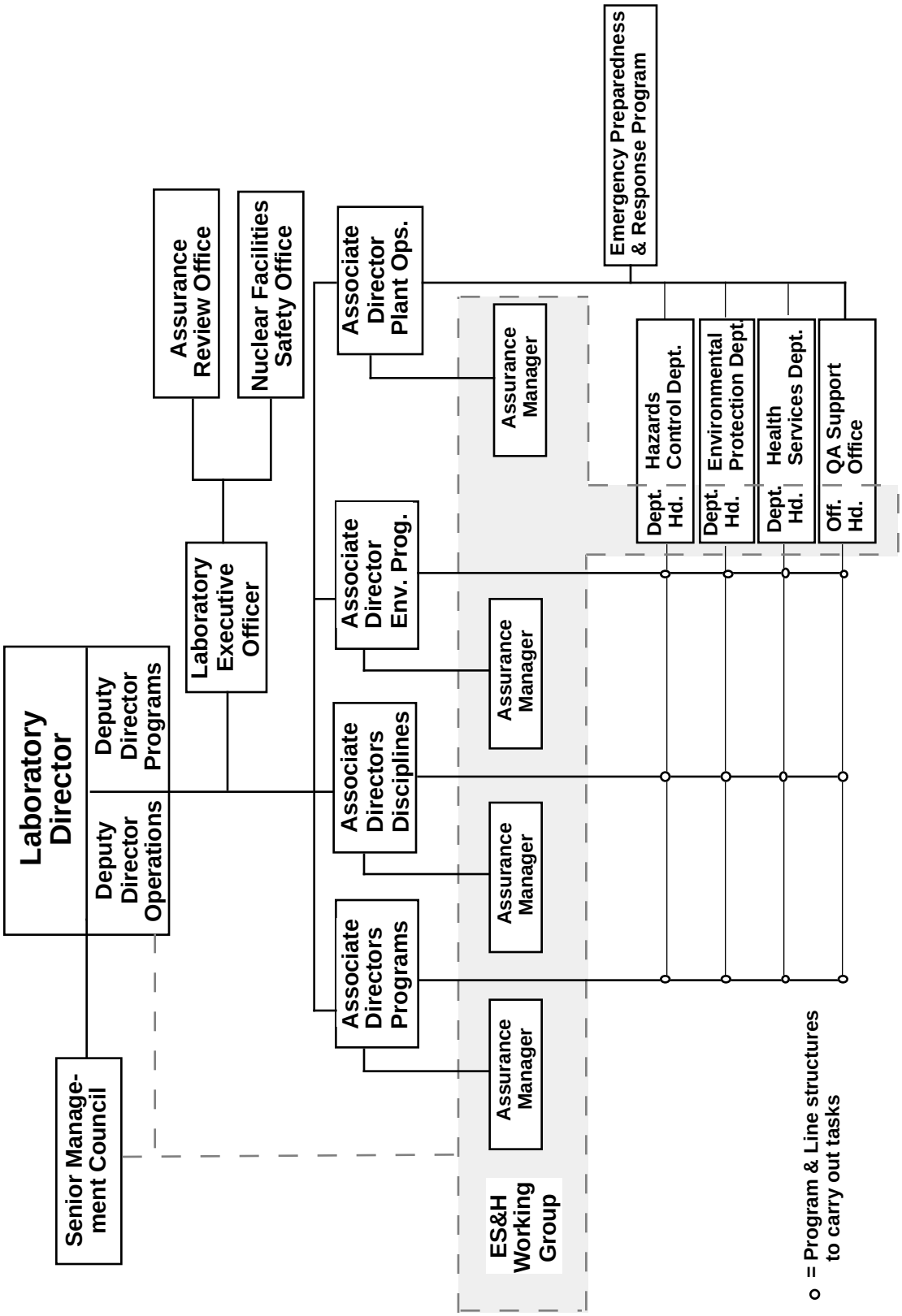

Exhibit 1-1. LLNL Organization for Environment, Safety, and Health.

1.2.1 Director

The Director is the Laboratory's Chief Executive Officer. He is also an official of the University of California (UC). As Chief Executive Officer, the Director manages and is accountable for all Laboratory operations and activities, including ES&H.

The Director's ES&H responsibilities include ensuring the implementation and overall effectiveness of the Laboratory's Environmental, Safety, and Health Program, and the Laboratory's compliance with applicable ES&H laws and regulations and with Contract 48 requirements.

1.2.2 Deputy Director

The Deputy Director is appointed by the Director, confirmed by the Regents, and is a member of the Laboratory's executive management team. The Deputy Director assists the Director in discharging the Director's responsibilities and acts in the Director's behalf when the Director is absent. The Deputy Director has special interest in science and technology efforts.

1.2.3 Deputy Director for Operations

Effective November 1, 1994, there will be a Deputy Director for Operations (DDO). The DDO is appointed by the Director, confirmed by the Regents, and is a member of the Laboratory's executive management team. He assists the Director by managing Laboratory-wide business, administrative, and operational activities, including ES&H.

Other significant functions include serving as an interface between the Senior Management Council and the ES&H Working Group and referring to the Director those ES&H management issues that require the Director's decision or approval.

The authority of the DDO extends to representing the Director both internally and externally on matters related to Laboratory business, administration, and operations; the approval of institutional ES&H policies for the Director; and the approval of institutional business, administrative, and operations plans. The DDO also approves requests for exemptions and variances from mandatory codes, standards, and DOE requirements.

1.2.4 Laboratory Executive Officer

The Laboratory Executive Officer (LEO) is appointed by the Director and, among other duties, assists the Director in discharging ES&H oversight responsibilities for both programmatic and institutional activities. The LEO has the responsibility for providing an independent oversight function to assure the implementation of ES&H and quality requirements mandated by Laboratory policy. In addition, the LEO oversees the activities and reports to the Director on the effectiveness of the Assurance Review Office (ARO) and the Nuclear Facilities Safety Office (NFSO).

1.2.5 Associate Directors

As part of their general responsibilities and authorities, all ADs delegate ES&H responsibility and authority to managers in their line organizations; however, the AD remains accountable to the Director for ES&H performance and assurance. ES&H-related authority and responsibilities include the appointment of an Assurance Manager to oversee ES&H activities within the directorate, and approve budgets and expenditures for programmatic or functional activities, including the funding of ES&H-related activities.

In addition, ADs approve directorate-level ES&H plans and procedures, Occurrence Reports, and other ES&H documents requiring an AD signature. ADs also review and concur with requests for exemptions and variances from mandatory codes and standards, authorize the startup and shutdown of operations in assigned facilities, and authorize disciplinary actions of employees who willfully ignore or fail to comply with Laboratory ES&H rules and requirements.

1.2.5.1 Program Associate Director

Program AD responsibilities involve carrying out the technical ES&H work for ensuring that Laboratory ES&H policies and procedures are implemented within the operational areas. Program ES&H responsibilities include (1) the safe conduct of activities, (2) the assurance that the assigned Laboratory work force is properly trained to carry out its work, and (3) the appropriate utilization of facilities and procedures. The AD also ensures that the necessary operational safety documents for operations or experiments under his or her control are prepared and that these documents specify any special training requirements beyond the base skills necessary to accomplish the work. In the event of a safety or environmental incident within a program operation, the AD provides or coordinates the response and appropriate reporting of the incident with the other ADs whose staff and/or facilities are involved.

1.2.5.2 Facility Associate Director

The Facility AD is responsible for ensuring that the facility (i.e., one or more buildings assigned to the AD) operations are conducted safely and comply with applicable Laboratory ES&H requirements. The Facility AD also ensures that required ES&H documentation is prepared and maintained and that facility-specific training is identified, communicated, and obtained by personnel using the facility.

1.2.5.3 Payroll Associate Director

The Payroll AD is responsible for recruitment, hiring, and other aspects of personnel management of the work force assigned to the AD's payroll accounts. A fundamental responsibility is to ensure that these personnel have the base skills necessary for completion of assigned work and to provide the training necessary to maintain these

base skills. The AD maintains personnel and training records for the work force and verifies that all personnel complete the required, job-related training.

1.2.6 Managers

In the context of ES&H, managers are the employees who plan, organize, direct, and manage work and/or personnel in their programmatic, facility, or functional area of responsibility. Depending upon job function, a manager's responsibilities include knowing the applicable ES&H laws, regulations, and Laboratory policy requirements and ensuring that they are being appropriately implemented within the manager's area of responsibility. Managers must know and understand their own applicable ES&H responsibilities as well as those distributed to interfacing organizations. Managers must plan new operations with consideration for the potential effects on the environment and must minimize waste generation, environmental discharges, and safety risks during all activities. They are to design and conduct operations to assure that employee exposure to risk conforms to the ALARA objectives and that employee exposure to hazardous and radioactive materials does not exceed regulatory limits.

1.3 ES&H TECHNICAL SUPPORT

1.3.1 Associate Director for Plant Operations

The Associate Director for Plant Operations (AD/PO) reports to the DDO and is a member of the Senior Management Council. The AD/PO is the Laboratory's senior manager for ES&H technical support and represents the Laboratory, at the senior level, to DOE, UC, and other agencies on ES&H matters.

The AD/PO provides and manages the necessary ES&H expertise and technical support (guidance and services) to assist the other ADs and their line organizations in implementing the Laboratory's ES&H policies.

The AD/PO organization manages all institutional ES&H and Quality Assurance (QA) support resources, maintains an awareness of current DOE orders, regulatory requirements, codes, and standards and ensures that appropriate implementation guidance is issued. The AD/PO also manages and/or coordinates the response to Laboratory-wide ES&H and QA appraisals, assessments, audits, and inspections by DOE, UC, and other agencies, and tracks corrective actions.

1.4 ADDITIONAL ENVIRONMENT, SAFETY, AND HEALTH SUPPORT FUNCTIONS

1.4.1 Assurance Managers

Each AD appoints an Assurance Manager who oversees ES&H activities within the directorate and reports to the AD or Deputy AD with direct access to the AD. The Assurance Manager provides oversight of the directorate's ES&H activities for the AD and assists the AD in developing plans and procedures to ensure all directorate activities

comply with Laboratory and directorate ES&H policies. Assurance Managers are members of the Laboratory's ES&H Working Group.

1.4.2 Senior Management Council

The SMC advises the Laboratory Director on Laboratory policies and oversees the effectiveness of activities and programs to implement these policies. The SMC is chaired by the Laboratory Director and is composed of the Deputy Director, the DDO, the LEO, and the ADs. With respect to ES&H matters, the SMC periodically reviews Laboratory ES&H policies and recommends changes to the Director, assures the implementation of these policies, and reviews the effectiveness of their implementation.

The SMC establishes and oversees working groups and committees, provides a forum to receive input from Laboratory employees, and reviews and resolves outstanding institutional issues.

1.4.3 Environment, Safety, and Health Working Group

The ES&H Working Group supports the SMC. Its membership is composed of the ADs' Assurance Managers; the heads of the Hazards Control, Environmental Protection, and Health Services Departments; the Quality Assurance Office; and environmental counsel. The Working Group is chaired by one of its members and reports to the chairman of the SMC. The Working Group's broad membership and close association with the SMC provide a key mechanism for reviewing proposed ES&H policies and implementing effective ES&H guidance.

1.4.4 Assurance Review Office

The ARO conducts independent, internal ES&H appraisals to assure that Laboratory ES&H policies and their implementation are consistent with Laboratory requirements, DOE orders, and ES&H regulations. The head of the ARO reports to the LEO.

The ARO conducts independent assessments and appraisals, reviews and evaluates directorate self-assessments, and verifies the results achieved by LLNL ES&H and quality activities. It documents and reports the results of its independent assessments, audits, and appraisals; and it provides the central point of contact for external (e.g., DOE, UC, etc.) assessments, audits, and appraisals of Laboratory ES&H activities.

1.4.5 Nuclear Facilities Safety Office

The NFSO provides institutional safety oversight of LLNL nuclear facilities. The manager of the NFSO reports to the LEO.

The NFSO is supported by a Nuclear Facility Safety Committee (NFSC), which advises the NFSO manager on the interpretation of DOE directives and standards; participates in the planning, scheduling, and conducting of independent appraisals of LLNL nuclear

facilities; and participates in independent reviews of new operations in and modifications to such facilities.

The NFSO provides the Laboratory's point-of-contact for interactions with DOE, UC, and other agencies on ES&H matters in LLNL nuclear facilities. Members of the NFSO/NFSC have the authority to request or to review ES&H-related facility and operational documents and records and to observe operations and activities in nuclear facilities.

1.4.6 Emergency Preparedness and Response Program

LLNL's Emergency Preparedness and Response Program is under the AD/PO. It incorporates an emergency response plan that is based on a two-tier management and field response approach. Planning command and control and external communications are under a senior management-staffed Emergency Response Group while field response is under the command of the Fire Chief with other discipline support.

In an emergency, the Laboratory Emergency Duty Officer (LEDO) has authority to activate the appropriate level of response. LEDOs are appointed by the Director to act for the Director in an emergency and in related, non-emergency issues. A LEDO serves as the Emergency Manager when on duty until relieved by the Director or his designee.

1.4.7 Environmental Protection Department

LLNL management has designated the Environmental Protection Department (EPD) as the lead environmental support organization. In this role, EPD is responsible for providing Laboratory organizations with the guidance and expertise required to ensure that Laboratory personnel have the information necessary to meet the environmental requirements of the University of California; all relevant local, state, and federal regulations; and DOE Orders.

The following discussion first describes the operations of LLNL's EPD, followed by a description of DOE-OAK operations that pertain to LLNL's environmental protection program.

1.5 OPERATIONS OF LLNL'S ENVIRONMENTAL PROTECTION DEPARTMENT

EPD is organized to assist LLNL Programs in fulfilling their environmental compliance responsibilities detailed in Paragraph 9.f of DOE Order 5400.1, *General Environmental Protection Program*,[1] and in complying with all local, state, and federal environmental regulations and DOE Orders concerning environmental matters.

In its operations, EPD:

- Assesses LLNL's compliance and guides Laboratory Programs in complying with environmental laws, regulations, and DOE Orders.

- Assesses LLNL's compliance with environmentally related DOE Orders accepted under the UC/DOE contract and works to assist the Laboratory in achieving full compliance with those Orders.
- Develops and maintains Laboratory environmental plans and guidelines; prepares, reviews, and updates pertinent documents, reports, procedures, and plans.
- Educates and trains Laboratory employees on environmental issues and responsibilities.
- Informs management about pending changes in environmental regulations that may impact the Laboratory.
- Helps Laboratory Programs manage and minimize nonhazardous, hazardous, radioactive, and mixed wastes, including the implementation of recycling and waste minimization programs.
- Performs environmental monitoring of Laboratory operations.
- Determines the extent of environmental contamination from past activities.
- Remediates environmental contamination to acceptable standards.
- Responds to emergencies that impact the environment and provides guidance for cleanup, sampling, and reporting.
- Collects and maintains data related to compliance activities and other environmental concerns.
- Represents the Laboratory in day-to-day interactions with regulatory agencies.
- Ensures that hazardous waste generated at LLNL is managed in accordance with local, state, and federal regulations.
- Ensures that the appropriate EPD Division prepares occurrence reports under DOE Order 5000.3B, *Occurrence Reporting and Processing of Operations Information,*[6] for initial findings of effluent and surveillance monitoring. Prepares occurrence reports for occurrences that are the result of EPD activities.

EPD carries out this work under the direction of a Department Head and Deputy Department Head, who are assisted by a departmental staff. This staff provides general support in the areas of:

- Administrative functions.
- Training.
- Resource management.

- Waste certification.
- Quality assurance.

The Department is divided into four operating divisions:

- Operations and Regulatory Affairs Division (ORAD).
- Hazardous Waste Management Division (HWMD).
- Environmental Restoration Division (ERD).
- Environmental Monitoring and Analysis Division (EMAD).

Exhibit 1-2 identifies the organizational structure of EPD by function and depicts the responsibilities, activities, and interrelationships of the organizational units and their subdivisions.

The activities of the four EPD operating divisions are described in more detail in the following subsections.

1.5.1 Operations and Regulatory Affairs Division

ORAD helps Laboratory Programs to operate in an environmentally sound manner and meet environmental compliance requirements. The ORAD staff consults with Laboratory personnel on regulatory compliance and permitting issues in a variety of environmental areas (e.g., hazardous, radioactive, and mixed waste; nonhazardous waste; tanks; spill prevention; air emissions; chemical tracking; medical waste; waste minimization and pollution prevention; inspections; and sampling) to help identify and mitigate potential environmental compliance problems in existing and planned projects.

Principally, the ORAD staff:

- Works with Laboratory line operations and staff to interpret pertinent environmental regulations and requirements, technically analyzes operations and evaluates new facilities and operations during planning stages to identify potential environmental problems, assists Laboratory organizations in evaluating environmental protection controls and procedures so those organizations can ensure they are properly implemented, identifies permitting needs, and obtains the necessary permits.
- Responds to emergencies and other urgent environmental problems and advises on environmental cleanup standards, sampling, and regulatory reporting.
- Issues guidance documents that describe how environmental laws, regulations, and DOE Orders are implemented at the Laboratory.

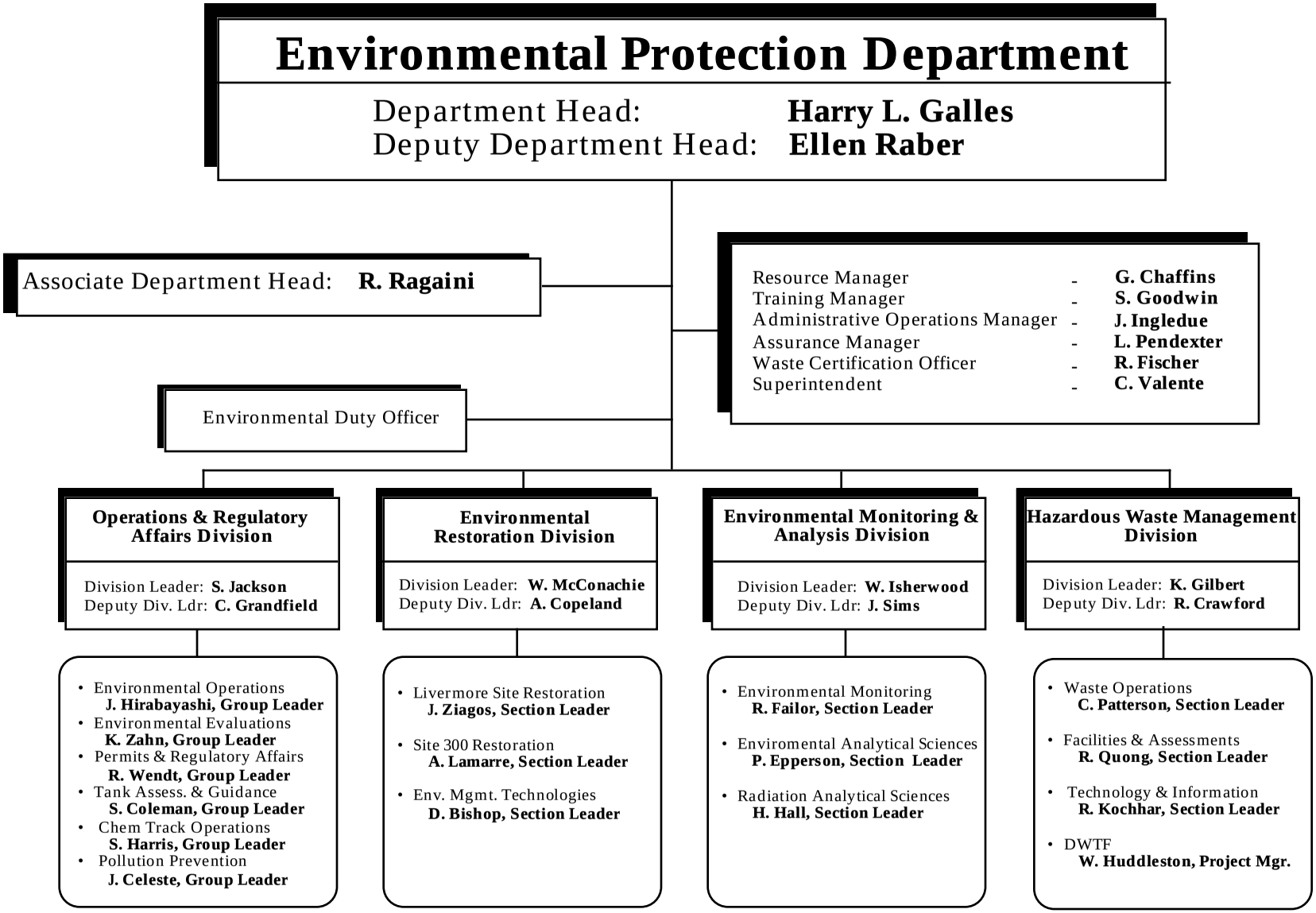

Exhibit 1-2. Environmental Protection Department Organizational Structure

- Develops and maintains a chemical tracking database.
- Prepares permits and regulatory documents and guides Laboratory organizations through the regulatory process to help ensure they meet the regulatory requirements.
- Prepares documentation for compliance with the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA), DOE guidelines, and other NEPA- and CEQA-related laws and regulations.
- Works with the EPD Training Section to prepare and present in-house training programs for Laboratory employees on environmental issues, sampling methodologies, and waste-handling protocols.
- Acts as the LLNL interface with local, state, and federal environmental regulatory agencies on environmental issues within ORAD's purview.
- Samples soils and other on-site media related to tanks, preconstruction, and spills to confirm that there is no contamination; and samples other media on an as-needed basis for environmental compliance and potential impacts.
- Conducts activities to ensure cultural and biological resources are identified and protected as appropriate.
- Provides waste minimization and pollution prevention technical guidance and design capabilities; helps Programs develop pollution prevention procedures; and meets regulatory waste minimization reporting requirements.
- Coordinates the annual update of EPIP.[2]

Guidance documents issued by ORAD are important factors in providing Laboratory employees with the information to conduct Laboratory operations in an environmentally sound manner. Previously, guidance documents were included in the *Environmental Protection Handbook*,[7] along with a statement of Laboratory policy on environmental matters, so that a complete set of guidance information was quickly and easily available to employees. A new *Environmental Compliance Manual* is currently being developed that will replace the *Environmental Protection Handbook*.[7] Topic-specific guidance documents will be included in the *Environmental Compliance Manual* as appendices when of value to LLNL personnel.

1.5.2 Hazardous Waste Management Division

HWMD manages all hazardous, radioactive, and mixed wastes generated at all Laboratory facilities. Laboratory facilities include the Livermore Site, Site 300, and four satellite facilities located at Research Drive, the Livermore Airport, Camp Parks, and Almond Avenue; however, the satellite facilities may generate little or no waste.

Operationally, the HWMD staff processes these wastes for temporary storage, treated waste, or transportation for either recycling or off-site disposal.

Principally, the HWMD staff:

- Operates and maintains LLNL hazardous and radioactive waste management facilities.
- Processes, stores, packages, solidifies, treats, and prepares waste for shipment and disposal, recycling, or discharge to the sanitary sewer.
- Tracks and documents the movement of hazardous, mixed, and radioactive wastes from waste accumulation areas to final disposal.
- Ensures that waste is managed in accordance with local, state, and federal regulations and DOE Orders.
- Studies and plans new waste treatment technologies and facilities to increase waste treatment and waste monitoring capabilities.
- Decontaminates laboratory equipment.
- Ensures that containers for shipment of waste meet specifications of the U. S. Department of Transportation and other regulatory agencies.
- Responds to emergencies and participates in the cleanup of hazardous and radioactive spills at LLNL facilities.
- Provides assistance to waste generators in packaging, labeling, and certifying wastes.
- Locates and evaluates off-site hazardous waste management facilities to ensure LLNL hazardous waste shipped to those facilities is appropriately managed.

Additionally, HWMD is actively involved in locating and evaluating facilities that are permitted to accept mixed waste and subsequently ensuring that shipments from LLNL meet the acceptance criteria of any selected site. Several commercial sites are being evaluated for the treatment of mixed waste, including the incineration of organic materials and the filtering and milling of uranium scrap. Improved aqueous mixed waste treatment is being implemented by HWMD. HWMD will continue to aggressively pursue a resolution to the problem of disposal of mixed waste until an acceptable solution is identified.

1.5.3 Environmental Restoration Division

ERD manages and conducts the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Superfund) ground water cleanup for the Livermore Site and Site 300, in compliance with Federal Facility Agreements (FFAs) between state and federal environmental agencies. ERD investigates the sources of

contamination, characterizes subsurface conditions, and designs and implements remedial actions for soil and ground water contamination that resulted from past hazardous materials handling practices during Navy and Laboratory operations. The resulting contamination consists primarily of solvents in the ground water in concentrations above drinking water standards. The ERD staff plans, directs, and conducts environmental assessments to determine the impact of past releases to the soil and ground water, and evaluates the potential risks to human health and the environment. ERD implements remedial actions to reduce contamination to levels that will protect human health and the environment.

Principally, ERD:

- Conducts source investigations to determine the existence and extent of soil contamination and the potential impact on ground water.
- Evaluates and delineates the subsurface aquifers to determine the horizontal and vertical distribution of contamination in the ground water, and to select the best cleanup approaches.
- Designs optimal remedial actions to remediate saturated and unsaturated sediments by extracting and treating ground water and soil vapor.
- Researches, develops, evaluates, and implements remediation technologies.
- Constructs, operates, and maintains facilities to treat and discharge ground water and soil vapor in compliance with state and federal requirements.
- Develops and uses computer ground water and vadose zone fate and transport models to optimize remedial activities.
- Monitors remediation progress and takes actions to expedite cleanup time.
- Provides assistance and guidance on corrective actions, such as soil removal and remediation of sites that have been impacted by leaking underground storage tanks and piping.
- Provides advice and technical input for the LLNL ground water surveillance program.
- Provides expertise and advice for closure of inactive facilities to mitigate potential environmental contamination.
- Negotiates and communicates remedial approaches, and reports remediation progress to the community and the regulatory agencies.
- Advises DOE-OAK, Department of Energy Headquarters Office (DOE-HQ), and local, state, and federal environmental regulatory agencies on restoration methods / solutions and issues.

1.5.4 Environmental Monitoring and Analysis Division

EMAD functions include monitoring, sample analysis, risk assessment, regulatory compliance, waste and wastewater permitting, and reporting. The Division is responsible for monitoring the environmental effects, both radiological and nonradiological, of effluent streams (air and wastewater). EMAD also conducts radiological and nonradiological surveillance monitoring of direct radiation and all environmental media (air, soil, surface water, ground water, vegetation, and foodstuffs). The Division staff supports program and institutional needs regarding wastewater compliance. The EMAD staff also supports the chemical and radiological analytical needs both of waste generators and of HWMD to identify, characterize, and certify waste for proper disposal. The Division staff also conducts risk assessment and impact modeling and analysis, and it supports LLNL's emergency preparedness.

Principally, the EMAD staff:

- Conducts operation effluent monitoring and reporting.
- Conducts environmental surveillance monitoring and reporting.
- Provides wastewater regulatory compliance support.
- Provides hazardous sample analysis.
- Provides radiation sample analysis.
- Conducts radiological risk assessments.
- Conducts environmental sampling development and training.
- Prepares and maintains the stormwater pollution prevention permits, plans, and monitoring plans.

The Division is responsible for the following reports and forms: sewer monitoring and point-source discharge reports; the LLNL site-wide annual *Environmental Report*;[8] Effluent Information System and Onsite Discharge Information System (EIS/ODIS) report forms for radioactive effluent and discharges; annual form reports on stormwater discharges associated with industrial activities at the Livermore Site and Site 300; annual radionuclide effluent reporting under the National Emission Standards for Hazardous Air Pollutants (NESHAPs) of the Clean Air Act; and quarterly beryllium ambient air concentration reports to the Bay Area Air Quality Management District.

1.6 DOE-OAK OPERATIONS RELATING TO LLNL'S ENVIRONMENTAL PROTECTION PROGRAM

The Manager of the DOE-OAK office has the responsibility to ensure that all operations of the office comply with applicable environmental laws, regulations, and DOE directives. To that effect, the Manager of DOE-OAK issued an Environmental Protection Policy Statement on January 29, 1990 (see **Appendix B**).

Exhibit 1-3 identifies the DOE-OAK organizational structure by function. Key responsibilities are:

- The Assistant Manager for Defense Programs (AMDP) is the Site Manager for LLNL and is delegated responsibility for all environmental, safety, health, and quality assurance issues at the Laboratory. The AMDP is responsible for:
  - — overseeing the Environment, Safety, and Facility Operations Division (ESFOD) and Weapons, Lasers, and Reimbursables Division (WLRD). ESFOD and WLRD are responsible for Resource Conservation Recovery Act (RCRA) compliance until such time as waste leaves a waste accumulation area, and for some aspects of waste minimization; and
  - — stopping work, if necessary, because of danger to the workers, the public, or the environment. After an action is taken, the appropriate managers are informed of the action. The restart of work is also granted by the AMDP.
- The Assistant Manager for Environmental Management and Support (AMEMS) is responsible for:
  - — providing technical support to the AMDP upon request; and
  - — overseeing the Waste Management Division (WMD), which is generally responsible for LLNL's Building 612 complex; treatment and disposal of hazardous, radioactive, mixed, and nonhazardous wastes; and some aspects of waste minimization; and
  - — overseeing the Environmental Restoration Division (ERD), which is responsible for environmental restoration and CERCLA issues; and the Environmental Planning and Technology Division (EPTD), which performs environmental planning.
  - — responding to specific requests from Environment, Safety, and Health (EH). The AMEMS responds to the requests in several ways: the executive secretariat, memoranda or letter, or verbally. This information is coordinated with Defense Programs, DP-20.

Significant environmental compliance issues identified by ESFOD and the appropriate program divisions are brought to DOE-HQ's attention through weekly conference calls.

Further reporting is achieved through daily, weekly, and biweekly reports to the Secretary, S-1. Obtaining environmental permits is the responsibility of LLNL and the appropriate Program.

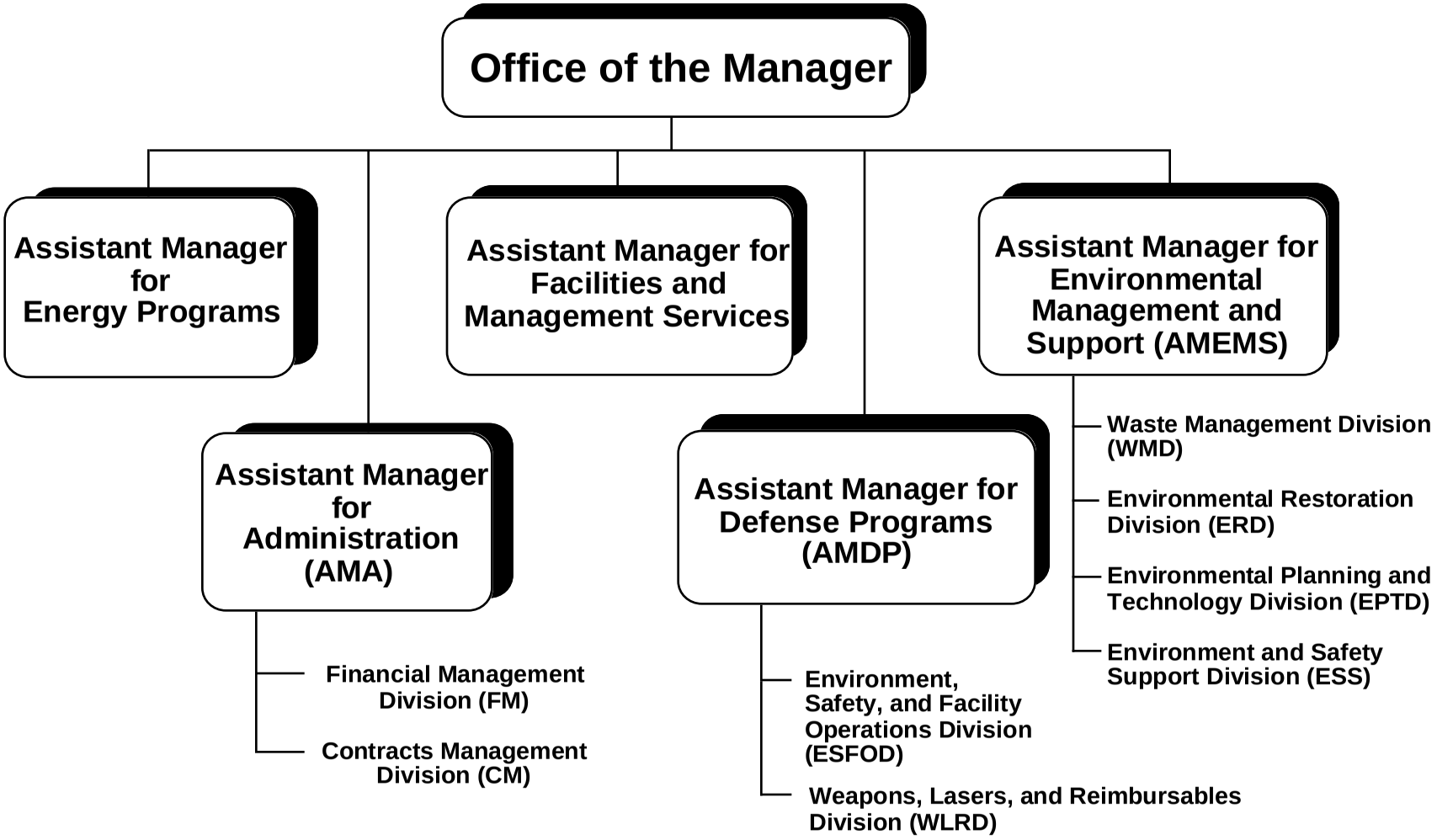

Exhibit 1-3. U.S. Department of Energy, Oakland Operations Office, Organization of Environmental Responsibilities

ESFOD is responsible for conducting ES&H appraisals of LLNL activities in accordance with DOE Order 5482.1B, *Environment, Safety, and Health Appraisal Program*.[9] These appraisals are transmitted to the contractor, and copies are sent to the Assistant Secretaries for Defense Programs (DP), Environmental Restoration and Waste Management (EM), and the Office of Environment, Safety, and Health (EH) at DOE-HQ. Corrective action plans are reviewed, approved, and tracked by ESFOD.

To ensure LLNL conducts its operations in compliance with the letter and spirit of environmental statutes, regulations, and standards, the Oakland Operations Office, HQ, and state and local regulatory agencies provide independent oversight, confirmation, and independent verification of LLNL compliance activities. Through an *Agreement in Principle* (AIP)[10] between the state of California and DOE/LLNL, ESFOD has responsibility for interfacing with the state of California, coordinating the state's oversight of the LLNL environmental program, and keeping the AIP Program Manager informed of LLNL AIP activities. The Environment and Safety Support Division (ESS) is responsible for AIP policy coordination and cross-cutting issue resolution involving all DOE-OAK sites.

Budget requests are outlined in DOE's *Environmental Management-Site Specific Strategic Plan,* which is updated annually. All budgets are reviewed for consistency, with major responsibility for this area lying within WMD, ERD, and EPTD.

The long-range plans (e.g., Office of Management and Budget [OMB] Circular A-106, etc.) that are required by the DOE-HQ's DP, EH, and EM are prepared and compiled by LLNL and the appropriate programs. These plans are reviewed by ESFOD, WMD, ERD, and EPTD, and the Financial Management (FM) and Contracts Management (CM) Divisions at DOE-OAK.

DOE-OAK encourages public participation in environmental decisions by using press releases and specific outreach programs. DOE-OAK also participates in, and provides input to, the LLNL environmental program.

2.0 Notification of Environmental Occurrences

Notification of environmental occurrences is required under a number of environmental laws and regulations; under the 5500 series of DOE Orders; and under DOE Orders 5000.3B, *Occurrence Reporting and Processing of Operations Information*,[6] and 5484.1, *Environmental Protection, Safety, and Health Protection Information Reporting Requirements*.[11] This section describes the notification procedures used by LLNL and DOE-OAK.

2.1 LLNL NOTIFICATION PROCEDURES

2.1.1 Current Notification Procedures for Environmental Occurrences

DOE Order 5000.3A[12] was superseded by DOE Order 5000.3B,[6] including Change 1, on July 2, 1993. This replacement was accepted as part of DOE's contract with the University of California on December 6, 1993, and transmitted to LLNL. LLNL is complying with the new Order with the "Implementing Procedures for DOE Order 5000.3B," signed by Ron Cochran, LLNL Executive Officer, on July 20, 1994. These implementing procedures have been distributed to all Assurance Managers and LLNL personnel who are involved with writing Occurrence Reports. They are also available on the computer system file server for all employees. The Occurrence Reporting training class, EM 2010, has been modified to reflect the new Order, with Change 1.

EPD has established a 7-days-a-week, 24-hours-a-day, on-call rotational position entitled the Environmental Duty Officer (EDO). The on-duty EDO can be reached by pager or by cellular phone at any time during on hours and off hours.

During normal work hours, Laboratory employees report all environmental incidents to the Environmental Operations Group (EOG) Environmental Analyst (EA) assigned to support their program area. The EOG EA then notifies the on-duty EDO of the incident, and together they determine applicable reporting requirements to local, state, and federal regulatory agencies and to DOE. The EDO and the EOG EA also notify and consult with Program management.

Notifications to environmental regulatory agencies, the State Office of Emergency Services, the state Department of Health Services, and the National Response Center (NRC) are generally made by the EDO, but notifications may occasionally be made by other EPD personnel who normally handle other compliance issues with the involved agency. Notifications are made upon the concurrence and the approval by the appropriate EPD Division Leader, the EPD Department Head, and the LEDO, who is a senior LLNL management official with authority to commit Laboratory resources on behalf of the Director during an emergency. All notifications to DOE under DOE Order 5000.3B[6] are made by the LEDO or the LEDO's designee after discussion with the

program. In most cases, the LEDO's designee, the LLNL Occurrence Reporting Office, makes the notification to DOE.

During off hours, Laboratory employees report all environmental incidents to the Fire Dispatcher, who, in turn, notifies the EDO and possibly the Fire Department. The EDO then calls out additional EPD support to the incident scene, as necessary, and follows the same procedures as outlined above for normal work hours.

Guidelines for environmental emergency response have been written by EOG of EPD for inclusion in *LLNL Emergency Preparedness*[13] implementing procedures. In addition, guidelines specifically for EPD personnel have been developed as *Environmental Incident Notification and Reporting Procedures*. These procedures cover local, state, and federal requirements, including DOE Order 5000.3B,[6] and are intended to provide a hands-on resource for use by EPD personnel when responding to an environmental occurrence.

2.1.2 Current Procedures for Preparing and Submitting Radioactive Effluent and On-Site Discharge Data Reports

The Environmental Monitoring Section (EMS) of EPD's Environmental Monitoring and Analysis Division is responsible for effluent monitoring. LLNL's Hazards Control Department (HCD) conducts ongoing radiological monitoring of effluent gases that could potentially contain radioactive materials. After sampling and analyzing these effluents, HCD reports the results to EMS, which, in turn, interprets and reports the radioactive air release and dose information to appropriate agencies via the *LLNL NESHAPs Project Annual Report*,[14] the annual DOE EIS/ODIS report forms, and the LLNL site-wide annual *Environmental Report*.[8]

EMS conducts ongoing radiological monitoring of sewage effluents that potentially could contain radioactive materials. The section monitors sewage flow and radioactivity on a daily basis, so that the average and the total radioactivity may be calculated.

Currently, all collected radiological monitoring data are archived by EMS. Annually, EMS reports all radioactive effluents and on-site discharges of radioactive liquids and gases to the Waste Information System Branch of DOE, on the EIS/ODIS report forms. The EIS/ODIS report forms, which are archived, describe the average radiological concentrations of materials comprising the effluents and discharges as well as the total quantity of radioactivity released.

These radiological monitoring and reporting activities fulfill the reporting requirements for radioactive effluent, on-site discharge, and unplanned release reports discussed in **Section 5.2** of this document.

2.1.3 Identification of Managers and Key Personnel Responsible for Detecting, Remediating, Reporting, and Documenting Environmental Occurrences

Environmental occurrences, not all of which are immediately dangerous to human health or the environment, may be divided into two types. One type comprises those occurrences that are detected by LLNL's network for monitoring stack emissions, sanitary sewer discharges, and all environmental media that could be impacted by LLNL operations. (See **Section 5.1** for a description of the coverage of this network.) The second type comprises other types of spills of hazardous materials.

EMS, which operates continuous-monitoring equipment for the sanitary sewer system, is responsible for preparing data reports to DOE and the Livermore Water Reclamation Plant (LWRP) when spills to the sewer are detected, or when unusually high concentrations of regulated substances are seen in routine sewer sampling results. Depending on the specific circumstances of the event, EMS and EOG may both have responsibilities for the investigation of such incidents, for the development and implementation of corrective action, and for follow-up reporting. If a responsible Program is identified, corrective action implementation and reporting functions normally are the responsibility of that Program.

The EOG EA is responsible for responding to and coordinating cleanup of hazardous and radioactive spills. When notification of a release must be made to an environmental regulatory agency, verbal notification is made by the EDO upon concurrence by the appropriate EPD Division Leader, the EPD Department Head, and the LEDO. Follow-up written reports to environmental regulatory agencies are prepared by the appropriate EA and submitted under EPD Department Head signature. Verbal notification to DOE of an incident under DOE Order 5000.3B[6] is made by the LEDO or the LEDO's designee. Follow-up written reports to DOE, required under DOE Order 5000.3B,[6] are prepared by the program in which the occurrence took place. The EOG EA assigned to support the program is available to provide assistance in completing the written reports.

Documentation prepared for each environmental occurrence is currently archived within the originating Laboratory organization. The documentation is made available to inspectors from relevant regulatory agencies, to DOE auditors, and, upon request, to the general public.

2.2 NOTIFICATION POLICIES AND PROCEDURES OF DOE-OAK

It is DOE-OAK's policy to report releases of hazardous materials as soon as possible after DOE-OAK is notified by the contractor. The DOE-OAK Duty Officer Procedure provides for the notification of the State Office of Emergency Services, the state Department of Health Services, the NRC, and the DOE-HQ Emergency Operations Center (EOC). However, by agreement with DOE, the contractor generally makes these notifications. The DOE-San Francisco Office (DOE-SAN) Management Directive (MD), *Notification and Investigation of Occurrences,* under DOE Order 5484.1[11] provides direction

to DOE-OAK contractors for reporting off-normal situations such as environmental occurrences.

Each laboratory under the jurisdiction of DOE-OAK has established a policy that will ensure that DOE-OAK is notified of environmental occurrences. LLNL environmental monitoring personnel have been instructed to notify appropriate laboratory management if monitoring data indicate that a hazardous material has been released above the reportable quantities. Notification procedures are tested periodically during notification of off-normal situations that occur at a laboratory. Problems that are identified as a result of routine notifications are corrected as a part of normal procedural updates.

EIS/ODIS report forms for radioactive effluents and discharges are developed and submitted by the contractor in accordance with the *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance*.[15] The responsibility for transmitting these reports for LLNL to DOE-HQ and to the Waste Information Service Branch, EG&G Idaho, Inc., rests with LLNL's EMAD.

The individuals responsible for reporting environmental occurrences under DOE Orders 5000.3B[6] and 5484.1[11] are as stated in **Section 2.1**. The reports from these individuals are submitted to DOE-OAK for review and analysis. These reports are available for review by any organization through contact with DOE-OAK.

3.0 General Planning and Reporting

This section discusses general environmental plans and reports prepared by LLNL as required by DOE Order 5400.1.[1]

3.1 LONG-RANGE ENVIRONMENTAL PROTECTION PLAN

The requirement under DOE Order 5400.1[1] for a Long-Range Environmental Protection Plan is satisfied through use of the information contained in the *Environmental Management-Site Specific Strategic Plan*[16] and the "Baseline Environmental Management Report" (BEMR), which are prepared at DOE's direction. The Strategic Plan was submitted in September 1994. The Fiscal Years 1997-2001 BEMR development process will begin in January 1995.

The LLNL *Environmental Management-Site Specific Strategic Plan*[16] reflects the vision, goals, and actions of the Assistant Secretary's Environmental Management Strategic Plan. Critical environmental issue areas are prioritized and identified in the Plan. Planning is also accomplished through the ERWM Activity Data Sheet development process and the Environmental Restoration and Waste Management Baseline, to determine the activities necessary to resolve ERWM issues. A draft of the Fiscal Years 1996-2000 Activity Data Sheet input was submitted in April 1994.

Work on the Strategic Plan is the responsibility of the appropriate EPD Division Leader, the Division Resource Manager, and the EPD Department Office.

3.2 ANNUAL SITE ENVIRONMENTAL REPORT

The annual site environmental report, entitled the *Lawrence Livermore National Laboratory Environmental Report for 19XX*[8] (where 19XX represents the year being reported), consists mainly of data collected from the LLNL environmental monitoring network and a discussion of regulatory compliance. As an example, the regulatory compliance section includes a detailed discussion of ground water remediation and cleanup activities including regulatory milestones, the installation of new treatment facilities, and the development and implementation of new treatment and remediation technologies. The data are summarized and analyzed in accordance with written procedures designed to meet the guidance provided both by DOE (in Order 5400.1, *General Environmental Protection Program*[1]) and by the U.S. Environmental Protection Agency (EPA). The report also includes a compliance summary and information on waste minimization, as well as environmental monitoring data. The *Environmental Monitoring Plan* (EMP)[17] and associated procedures describe methods for monitoring and statistical analysis, tracking of data and samples, notification of management in the case of unusual values, quality assurance, and archiving of data.

The primary responsibility for the annual environmental report rests with the EMS Leader. The annual environmental report is to be prepared by the first of June of the year following the reporting year. However, the actual delivery date for the report is negotiated with DOE-OAK.

3.3 OFFICE OF MANAGEMENT AND BUDGET CIRCULAR A-106

The OMB Circular A-106 is submitted annually by the Resource Manager of LLNL's EPD in conjunction with DOE-OAK. LLNL's Activity Data Sheet process and *Environmental, Safety, and Health Management at LLNL*[5] are used as the bases for listing approved or funded projects appropriate for reporting in Circular A-106.

3.4 ENVIRONMENTAL PROTECTION IMPLEMENTATION PLAN

LLNL prepares an EPIP[2] by November 9 of each year in accordance with DOE Order 5400.1, *General Environmental Protection Program*,[1] requirements. ORAD coordinates the preparation of the annual EPIP with additional input from EMAD, ERD, HWMD, the EPD's Administrative Office, and DOE-OAK. The EPIP includes a general description of LLNL's environmental protection program with overviews of general planning and reporting, special programs, monitoring, and quality assurance related to environmental activities at LLNL.

Table 3-1 lists the documents required under DOE 5400.1[1] and the associated preparation dates required by that Order. Schedules that will ensure those due dates are met are developed by the responsible EPD Division prior to the date each respective report is due, taking into account the current DOE guidance regarding production of that year's report, available resources, and competing priorities. If a due date can not be achieved, LLNL discusses the situation with DOE-OAK in advance of the due date. General information about the documents and the LLNL organizations responsible for preparing them are discussed in the applicable sections of the EPIP.[2]

Table 3-1. Environmental Documents Required Under DOE Order 5400.1.

Document Name	Next Preparation Due Date	Update Requirement
EIS/ODIS report forms	April 1, 1995	Annually
Environmental Monitoring Plan[17]	November 9, 1994[a]	Review annually; revise triennially
Environmental Protection Implementation Program (EPIP)[2]	November 9, 1994[a]	Annually
Ground Water Protection Management Program[18]	May 9, 1997	Review annually; revise triennially
Long-range environmental protection plan	Date determined by DOE	Annually[b]
OMB Circular A-106	Date determined by DOE	Annually[c]
Waste Minimization and Pollution Prevention Awareness Plan[19]	May 9, 1995[d]	Review annually; revise triennially
Environmental Report[8]	June 1, 1995[e]	Annually

[a] After submittal of the reports on November 9, 1994, due dates are November 9, 1997, for the *Environmental Monitoring Plan* and November 9, 1994, for EPIP.

[b] DOE Order 5400.1[1] does not specify a frequency, but LLNL has provided annual revisions as part of the *Environmental Management-Site Specific Strategic Plan*[16] and the Activity Data Sheet process.

[c] DOE Order 5400.1[1] requires DOE field office submittal by May 1 and December 15 each year, but LLNL has generally been required to provide input annually.

[d] Previously, LLNL prepared annual revisions. This preparation due date is based on LLNL resuming a three-year revision cycle at the direction of DOE-OAK and is based on the last revision date of May 1992.

[e] The complexity of this report and the changes in guidance can impact achieving this date.

4.0 Special Programs and Plans

This section discusses special programs and plans at LLNL that are required by DOE Order 5400.1[1] for ground water protection, waste minimization, and pollution prevention.

4.1 GROUND WATER PROTECTION MANAGEMENT PROGRAM

DOE Order 5400.1[1] requires contractors to have an overall ground water protection management program, which includes ground water protection monitoring. LLNL has prepared a *Ground Water Protection Management Program*[18] document to address the seven elements outlined in the Order and to provide an implementation plan. This document incorporates and discusses LLNL efforts to meet new regulatory requirements such as Storm Water Pollution Prevention.

Current LLNL ground water protection efforts consist of routine monitoring, investigation, and restoration activities at the Livermore site and Site 300. Routine ground water monitoring at both sites is conducted by EMS using the monitoring techniques described in *Sampling and Analysis Plan for Ground Water Monitoring of LLNL's Site 300 Landfill Pit 1 and Pit 7*[20] and in the EMP,[17] and by ERD, using sampling plans, procedures, and protocols discussed below.

At Site 300, in addition to investigation and restoration-related activities and other ground water monitoring, EMS conducts ground water monitoring around active and inactive land waste-disposal units in compliance with RCRA. Comprehensive ground water monitoring is also part of the general environmental surveillance program conducted by EMS in accordance with DOE Order 5400.1.[1] Monitoring results are reported in the *LLNL Site 300 Ground Water Monitoring Program Quarterly Reports,* [21] and in the site-wide annual *Environmental Report*.[8]

Ground water investigation, routine monitoring, and restoration activities are conducted by ERD in compliance with the CERCLA and applicable DOE orders. The activities for the Livermore site are described in *Work Plan, Lawrence Livermore National Laboratory Livermore Site: CERCLA Remedial Investigation/Feasibility Study,*[22] as well as in a number of supporting technical documents such as Remedial Investigation/Feasibility Study reports, Proposed Remedial Action Plan, and Fact Sheets. Activities for Site 300 are described in *Lawrence Livermore National Laboratory Site 300 Environmental Restoration Work Plan.*[23] Sampling procedures are detailed in *Environmental Restoration Program Standard Operating Procedures (SOPs);*[24] *LLNL Site 300 Environmental Restoration Project Standard Operating Procedures (SOPs);*[25] *Quality Assurance Project Plan, LLNL Ground Water Project;*[26] and *Quality Assurance Project Plan, LLNL, Site 300, Environmental Restoration Project*.[27]

ERD reports the results of the investigation and restoration work conducted at the Livermore site in a monthly series of reports, and in reports such as the various CERCLA Remedial Investigations, Feasibility Study, and Proposed Remedial Action Plan reports for the Livermore site. Formerly, ERD reported the results of the work conducted at Site 300 in a quarterly series of reports, *Lawrence Livermore National Laboratory Site 300 Environmental Investigations Quarterly*,[28] and in other topical reports, such as the *Final Site-Wide Remedial Investigation Report*.[29] Currently, ERD reports ongoing Site 300 investigation results in monthly letter reports and a series of Feasibility Study reports which are currently in preparation.

Primary responsibility for preparing a ground water protection management plan rests with the EMS Leader, with major input to the plan from ERD. The EMS Leader also has responsibility, with assistance from ERD, for reviewing the plan annually and updating it every three years.

4.2 WASTE MINIMIZATION AND POLLUTION PREVENTION AWARENESS PROGRAM

In order to implement LLNL's waste minimization policy (see **Appendix C**), the Pollution Prevention Group (PPG) provides technical guidance to LLNL Programs to help them plan pollution prevention projects and select and design waste-reduction technologies and equipment. PPG's ongoing efforts to identify substitutes for hazardous materials used in experimentation will eventually result in a reduction in the quantity of hazardous waste generated at LLNL. PPG also identifies areas where research and development efforts are necessary to develop suitable alternatives to materials and processes that produce waste. Although PPG does not have the authority to fund research and development proposals, project personnel write research proposals and identify potential sources of funding for the programs.

The *Waste Minimization and Pollution Prevention Awareness Plan for LLNL*[19] meets the requirements of (1) DOE Orders 5820.2a, *Radioactive Waste Management*,[30] and 5400.1;[1] (2) RCRA, Sections 3002(b) and 3005(h); and (3) Title 22 of the *California Code of Regulations*.[31] In addition to providing a general waste minimization plan for the Laboratory as a whole, the Plan incorporates a series of waste minimization plans prepared by the individual programs and directorates that are generators of waste.

The "Pollution Prevention Awareness Plan," required under DOE Order 5400.1,[1] was submitted to DOE in 1991 as part of the *Waste Minimization and Pollution Prevention Awareness Plan for LLNL*.[32] Subsequently this plan has been incorporated with waste minimization as the *Waste Minimization and Pollution Prevention Awareness Plan*.[33] This plan was updated in July 1994.[19]

Primary responsibility for developing the *Waste Minimization and Pollution Prevention Awareness Plan*, reviewing it annually, updating it every three years, and implementing

it rests with the Pollution Prevention Group Leader. The Plan reviews past and current waste minimization activities and states the objectives of LLNL's PPG, a direct-funded activity in ORAD, and identifies the Group's primary responsibility for developing and updating all required waste minimization reports. Programmatic plans that are appended to the main plan provide information specific to a Program or directorate, including descriptions of waste-generating processes. Overall, the Plan is designed to be dynamic and flexible so that it can be easily updated to meet evolving compliance requirements.

There have been significant changes in regulatory requirements that have affected LLNL operations, including recycled, non-RCRA wastes. The California Hazardous Waste Source Reduction and Management Review Act of 1989 (SB14) (added to *Stats.*, 1989, Chap. 1218.1) led LLNL to identify its largest hazardous waste streams and select waste minimization options for them, along with making a commitment for their implementation. The Pollution Prevention Act of 1990 required significant modification to the existing LLNL hazardous waste data reporting procedures; and the Land Ban placed new restrictions on the generation of mixed wastes. Other changes resulted from new definitions, requirements, and restrictions:

- The reduction by DOE of the level of radioactivity that defines waste as radioactive or mixed.
- New offset requirements for local air emissions that have increased the difficulty of obtaining air permits.
- Executive Order 12780, "Federal Agency Recycling and the Council on Federal Recycling and Procurement Policy," issued in September 1991 that requires new emphasis on the use of recycled materials by all federal facilities.
- California's increased restrictions on the quantities of nonhazardous wastes that may be disposed of in landfills.
- The directives by the DOE Secretary to participate in the EPA 33/50 program to reduce emissions of 17 priority chemicals and to submit progress reports on the program, as well as to phase out Class I ozone-depleting chemicals (ODCs) by the end of 1995 and to submit progress reports on this phase-out.

With these changes in mind, the strategies proposed in the *Waste Minimization and Pollution Prevention Awareness Plan*[19] are being implemented by two actions. The first action is to develop specific ways for the programs to prevent pollution, conserve resources, and minimize waste generation. This action includes creating incentives for pollution prevention; developing specific goals and schedules for waste minimization activities; promoting the use of nonhazardous materials; substituting, reformulating, modifying, managing, and/or recycling waste materials to achieve minimal adverse

effects; targeting policies, procedures, or practices that may present barriers to waste minimization; and integrating and coordinating waste generators' and waste managers' activities on waste minimization issues.

A primary way that this action is currently being implemented is through the use of Pollution-Prevention Opportunity Assessments (PPOA). PPG has been performing PPOAs on several major waste streams. These PPOAs identify cost effective pollution prevention projects for which funding is requested. In addition, the PPOAs identify technology gaps or improvements to existing technology that may reduce pollution. The net effect of conducting PPOAs has been to increase the awareness of LLNL Programs to pollution prevention opportunities.

The second action is to enhance communication of waste minimization goals and ideas. This involves developing and implementing employee pollution prevention awareness and occupational training programs, collecting and exchanging waste minimization information through technology transfer outreach and educational networks, and developing mechanisms for disseminating current technical information.

This action is implemented through the following day-to-day activities at LLNL:

- Communicating LLNL management commitment to curtail pollution.
- Publicizing the goals of pollution prevention.
- Educating individuals on pollution prevention through formal training courses.
- Organizing or participating in events implementing or identifying pollution prevention strategies.
- Recognizing individuals who practice pollution prevention.
- Reviewing historical events and their solutions, and using this information to recommend additional solutions to potential pollution problems.

These efforts are included in periodic LLNL publications, such as EPD's *Waste Notes* and LLNL's *Newsline*; booths at the April 1994 LLNL Earth Day Fair and at the October 1994 LLNL Energy Fair; and continuation of basic guidance through environmental training courses. These activities will be continued in Fiscal Year 1994–95. In addition, LLNL is currently preparing pollution prevention video tapes for use in new employee orientation, environmental training, and small-group discussions. Members of PPG work with related organizations, such as Plant Engineering Department's Energy Management Program, to integrate pollution prevention and energy conservation projects.

PPG, often assisted by Program representatives, provides reports on waste minimization, pollution prevention, and recycling to DOE, the state of California, and

local agencies when requested. Two of the major efforts in 1994 were a report on waste generation and waste minimization progress for 1993, as requested by the Department of Energy for both the Livermore Site and Site 300, and the *Source-Reduction Evaluation Review and Plan Summary*,[34] an update to the Livermore Site SB14 reports. Additionally, the University of California Contract 48 Performance Measures require waste minimization tracking and reporting on a quarterly basis.

Waste minimization and pollution prevention activities are funded by EM direct funding for planning and overhead funding for PPOAs. Additional funds have been requested for Fiscal Year 1995. Other LLNL organizations request programmatic funding to implement pollution prevention technologies.

5.0 Environmental Monitoring Program

This section provides an overview of LLNL's environmental monitoring activities and reports.

5.1 ENVIRONMENTAL MONITORING PLAN

LLNL prepared an EMP,[17] to meet requirements of DOE Orders 5400.1, *General Environmental Protection Program*,[1] and 5400.5, *Radiation Protection of the Public and the Environment*,[35] and DOE/EH-0173T, *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance*.[15] The EMP is reviewed annually and revised as needed, but it is updated at least triannually. Primary responsibility for preparing the EMP rests with the EMS Leader who coordinates the analytical and quality assurance staffs of EMS to develop the Plan.

The current LLNL environmental monitoring program has two major components. First, the program monitors effluents such as stack emissions and sewer discharges. Second, the program conducts surveillance monitoring of all environmental media that could be impacted by LLNL operations. This existing program involves a staff of more than 50 Laboratory scientists, technicians, and contractors; the collection of a large number of samples from a variety of environmental media; and the performance of more than 150,000 analyses per year. Analytical laboratory services are provided by certified contractors and on-site laboratories as discussed in **Section 6.2.1**.

Currently, the environmental monitoring program includes the monitoring of air, soil, surface waters, ground water, rain, sewage, vegetation, foodstuffs, noise, and direct radiation. The results of this monitoring effort are reported in the annual site-wide *Environmental Report*.[8] The parameters analyzed are determined by the likelihood of LLNL operations impacting the various environmental media.

The EMP explains monitoring networks, sampling locations, and measured parameters as well as methods and procedures for data collection, maintenance, and reporting, as specified in the *Environmental Monitoring Section Quality Assurance Plan*.[36] This document addresses all quality assurance and verification issues for monitoring data and specifies that all samples and data be collected in accordance with the written EMS procedures, published as Appendix B of the EMP. Included in the EMP procedures manual are the procedures that describe sampling locations and sampling frequencies; identify prescribed methods for sample collection, preservation, and submittal; and provide guidance for submittal of quality control samples and instructions for data receipt, analysis, and archiving. These procedures are reviewed annually and are updated as necessary. When new monitoring needs are identified, a monitoring design package is generated that covers both the basis for the monitoring and the methods to be used.

5.2 ENVIRONMENTAL MONITORING ACTIVITIES

Currently, LLNL implements environmental monitoring activities through three Divisions of LLNL's EPD.

- The Environmental Monitoring Section (EMS) in EMAD is responsible for most effluent and environmental surveillance monitoring.
- The Tank Assessments and Guidance Group (TAGG) in ORAD coordinates underground storage tank leak testing and conducts initial monitoring to determine if an underground tank has caused soil contamination.
- The Environmental Operations Group (EOG) does not perform continuous monitoring, but the ORAD group is responsible for performing related activities to help ensure no environmental releases have occurred; or, if they have occurred, that they have not caused contamination. These activities include providing guidance on spill cleanup and evaluating construction sites to determine whether any soil contamination exists.
- ERD is responsible for monitoring the impacts of past environmental releases to ground water and soil and evaluating the effectiveness of remediation efforts on the ground water.

These organizations collect, evaluate, report, and maintain environmental monitoring and environmental occurrence information and data in accordance with established procedures and protocols that are either written and referenced elsewhere in this document, or are in the process of being written and formalized as part of the EPD Quality Assurance (QA) program. Responsibility for the respective monitoring activities rests with Section or Group Leaders of EMAD, ORAD, and ERD. Where monitoring data or investigative efforts affect operations overlapping two or more of these groups, the respective leaders or, if necessary, the Division Leaders integrate and coordinate the activities to ensure that all objectives are met.

Reporting requirements for radioactive effluent, on-site discharge, and unplanned release occurrences are met as described in **Section 2.1.2**. Environmental monitoring data are reported and maintained pursuant to applicable local, state, and federal regulatory requirements and DOE environmental protection policies. Monitoring data are reported in the LLNL site-wide annual *Environmental Report,*[8] the *Semiannual Point-Source Waste Water Monitoring Report for Lawrence Livermore National Laboratory*,[37] the *LLNL Site 300 Ground Water Monitoring Program Quarterly Reports*,[21] various LLNL Site 300 Environmental Investigation, Remedial Investigation, and Feasibility Study reports, and the *LLNL Ground Water Project Monthly Reports*.[38] In these periodic reports, LLNL assesses its compliance with regulations applicable to the presence of contaminants in the environment.

Currently, the responsible Group or Division within EPD maintains environmental monitoring data pertinent to its area of responsibility. An Information Systems Committee makes recommendations for the optimum method of document storage and handling and for the assignment of responsibility within EPD for maintaining the integrity and completeness of stored information.

Responsibility for preparing and submitting required monitoring reports rests with:

- The EMS Leader for the site-wide annual *Environmental Report;*[8] the *LLNL Site 300 Ground Water Monitoring Program Quarterly Reports*;[21] the *Semiannual Point-Source Waste Water Monitoring Report for the Lawrence Livermore National Laboratory*;[37] monthly sewer monitoring reports, the annual NESHAPs report,[14] and the annual EIS/ODIS report forms, and spill reports to the Regional Water Quality Control Boards.
- The TAGG Leader for underground tank closure plans and reports, and underground storage tank testing results.
- The EOG Leader for internal EPD spill reports.
- The ERD Section Leaders for the Livermore Site and Site 300 monthly and quarterly ground water monitoring reports; and various topical reports, such as feasibility and proposed remedial action plan reports.

Budgetary resources for environmental monitoring activities will be obtained from operational overhead except for specific tasks that are direct-funded with operating and capital dollars.

6.0 Quality Assurance and Data Verification

This section discusses the quality assurance and data verification procedures used by LLNL and by DOE-OAK.

6.1 LLNL PROCEDURES FOR QUALITY ASSURANCE AND DATA VERIFICATION

This section discusses LLNL procedures covering the following topics:

- EPD QA Program.
- QA for Laboratory Certification.
- Certification of Laboratories.
- DOE Laboratory QA Program for Radioactive Material.
- Independent Data Verification.

6.2 QUALITY ASSURANCE PROGRAM

LLNL's EPD conducts environmental activities in a wide variety of technical areas. DOE has identified the need for a comprehensive management control system for these activities (DOE Order 5700.6C, *Quality Assurance,*[39] and 10CFR830.120[40]) and has directed LLNL to establish a program based on these requirements. The EPD management program includes an *EPD Quality Assurance Management Plan* (QAMP)[41] to ensure that controls are identified and implemented, as necessary, to plan, execute, and document the Department's environmental activities.

The goal of the QAMP[41] is to help provide verifiable scientific work and a management structure and attitude that directs attention to quality. Quality, the degree to which an item or process meets or exceeds the end user's requirements and expectations, is one of the top priority responsibilities of all personnel assigned to the EPD; and the verification of quality achievement is one of the responsibilities of the Quality Assurance Office staff of the Department.

The QAMP[41] delineates QA requirements. These requirements are derived from the criteria of American Society for Mechanical Engineers, NQA-1-1989, *Quality Assurance Program Requirements for Nuclear Facilities,*[42] and integrated with QA regulations and guidance provided in environmental compliance documents. The QAMP delineates the base requirements for all QA activities (i.e., record keeping, training, documentation, design control, etc.). These requirements are also applicable to LLNL organizations, contractors, and vendors who perform activities affecting quality for EPD. When these entities are governed by their own QA programs, the Department Quality Assurance Manager must review and concur with the plans and the Division Leader must approve

them. The Head of EPD reviews schedules and milestones for implementation plans for QA and 10CFR830.120[40] requirements and adjusts timelines as required.

The responsibility for maintaining the QAMP[41] lies with the EPD QA Manager. Division Leaders within the Department have direct management responsibility for implementing the QAMP as it relates to the quality-affecting activities of their Divisions. The HWM Division has a fully developed QA Program that is consistent with the Departmental QA Program. The HWM Program encompasses all the Division's activities, including selection of analytical laboratory services. The two Divisions that are responsible for conducting the major portions of the monitoring and surveillance activities within EPD are EMAD and ERD. These two Divisions have formal Quality Assurance Plans (QAPs) governing their activities. A fourth Division, ORAD, has limited involvement in monitoring and surveillance activities but has followed similar procedures under a QA program.

The *Environmental Monitoring Section Quality Assurance Plan* (QAP)[36] is followed for EMS activities. This QAP meets the requirements of DOE Order 5700.6C,[39] satisfying the requirements of DOE/EH-0173T, *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance*.[15] Primary responsibility for preparing and implementing quality assurance initiatives, including any modifications to the *Environmental Monitoring Section Quality Assurance Plan,*[36] rests with the EMS QA Coordinator and the EMS Leader.

ERD has an approved QAP that governs all activities performed by the Division. Under this plan, ERD has established QA project plans (such as the *Quality Assurance Project Plan*[26] and the *LLNL Site 300 Environmental Restoration Work Plan*[23]) and Standard Operating Procedures (SOPs) (such as the *LLNL Site 300 Environmental Restoration Program Standard Operating Procedures*[25]) for all ERD activities. These have been reviewed and approved by DOE, the EPA, the California Environmental Protection Agency (CAL-EPA), and the California Regional Water Quality Control Boards (San Francisco Bay and Central Valley Regions).

These plans cover QA and SOPs for the field activities of drilling, source investigation, monitoring, and treatment facilities as well as the Laboratory site activities of ERD employees, contractors, and matrixed personnel.

6.2.1 Certification of Laboratories

The following laboratories are currently used by EPD for analysis of environmental data. Outside contract laboratories may be changed with the rebidding of the contract or unsatisfactory performance.

6.2.1.1 Primary Outside Contract Laboratories

The following are the outside contract laboratories currently performing work in support of EPD activities:

- California Laboratory Services, 3249 Fitzgerald Rd., Rancho Cardova, CA 95742
- GTEL Environmental Laboratories, 4080 Pike Lane, Ste. C, Concord, CA 94520
- IT-St. Louis, 13715 Rider Trail North, Earth City, MI 63045
- Fruit Growers Laboratories, P.O. Box 272, Santa Paula, CA 93061
- Lockeed Analytical Laboratories, 975 Kelly Johnson Dr., Las Vegas, NV 89119
- Controls for Environmental Pollution (CEP), 1925 Rosina St., Sante Fe, NM 87502

These laboratories are assessed by EPD for QA procedures and laboratory standards and are certified by CAL-EPA as approved wastewater and hazardous waste laboratories.

6.2.1.2 LLNL Internal Laboratories

The internal laboratories are listed below with the departments/divisions in which they belong.

Environmental Monitoring and Analysis Division

- Environmental Analytical Sciences (EAS) Section
- Radiation Analytical Sciences (RAS) Section

Hazards Control Department

- Hazards Control Analytical Laboratory

Chemistry and Materials Science Department

- Analytical Sciences Division
- Isotope Sciences Division

Environmental Sciences Division

- Radiochemistry Laboratory

Environmental Restoration Division

- Environmental Chemistry Laboratory
- Soils Characterization Laboratory
- Microbiology Characterization Laboratory

The EAS Section, the Hazards Control Analytical Laboratory, and the RAS Section are certified as approved wastewater and hazardous waste laboratories through the Environmental Laboratory Accreditation Program by the state of California Department of Health Services.

The LLNL internal specialized laboratories that do not currently possess state certification are used for environmental, radiological, and high-explosives analyses for which certification is not necessary.

6.2.2 DOE Laboratory QA Program for Radioactive Material

LLNL's EMAD, which performs most of the radiological analyses through their RAS Section, participates in the DOE-Environmental Measurements Laboratory QA intercomparison program. Responsibility for ensuring appropriate participation in this interlaboratory QA program rests with the EMAD Division Leader .

6.3 INDEPENDENT DATA VERIFICATION

According to the DOE memorandum, "Clarification of Environmental Protection Implementation Plan (EPIP) Guidance," former Secretary Watkin's June 27, 1989, 10-point initiative to open DOE facilities to environmental monitoring by the states in which these facilities reside ". . . satisfies DOE Order 5400.1 requirements for independent data verification."[43] Accordingly, no input is required from LLNL for this section.

In addition, an *Agreement in Principle*[10] has been signed and implemented by the DOE and the state of California that includes co-monitoring by the state to determine the impacts of LLNL operations.

6.4 DOE-OAK PROCEDURES FOR QUALITY ASSURANCE

The DOE Site Manager has assigned the institutional ES&H and QA responsibilities to its ESFOD. Contractor project-specific QA plans will be reviewed for adequacy and verified for effective implementation. Laboratory certification, participation in the DOE interlaboratory QA program, and independent data verification by the states will also be performed. Regularly scheduled, independent, quality-verification activities (e.g., reviews, surveillances, appraisals, and audits) are a major, active part of this program.

Acronyms

AD(s)	Associate Director(s)
AD/PO	Associate Director for Plant Operations
AIP	Agreement in Principle
ALARA	As low as reasonably achievable
AMDP	Assistant Manager for Defense Programs, DOE-OAK
AMEMS	Assistant Manager for Environmental Management and Support, DOE-OAK
ARO	Assurance Review Office
BEMR	Baseline Environmental Management Report
CAL-EPA	California Environmental Protection Agency
CEP	Controls for Environmental Protection
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CM	Contracts Management, DOE-OAK
DDO	Deputy Director for Operations
DOE	U. S. Department of Energy
DOE-OAK	DOE Operations Office, Oakland Office, Oakland, CA
DOE-HQ	DOE Headquarters Office, Washington, D. C.
DOE-SF	Prior acronym for DOE-OAK
DOE-SAN	Prior acronym for DOE-SF
DP	Defense Programs, DOE-HQ
EA	Environmental Analyst
EAS	Environmental Analytical Sciences
EDO	Environmental Duty Officer
EH	Environment, Safety, and Health, DOE-HQ
EIS/ODIS	Effluent Information System and On-site Discharge Information System
EM	Environmental Restoration and Waste Management, DOE-HQ
EMAD	Environmental Monitoring and Analysis Division, Environmental Protection Department (LLNL)
EMP	Environmental Monitoring Plan
EMS	Environmental Monitoring Section, EMAD, EPD
EOC	Emergency Operations Center, DOE-HQ
EOG	Environmental Operations Group, ORAD, EPD
EPA	U. S. Environmental Protection Agency
EPD	Environmental Protection Department, LLNL
EPIP	Environmental Protection Implementation Plan
EPTD	Environmental Planning and Technology Division, DOE-OAK

ER	Environmental Restoration
ERD	Environmental Restoration Division, DOE-OAK
ERD	Environmental Restoration Division, Environmental Protection Department, (LLNL)
ERWM	Environmental Restoration and Waste Management
ES&H	Environment, Safety, and Health
ESFOD	Environment, Safety, and Facility Operations Division, DOE-OAK
ESS	Environment and Safety Support Division, ESFOD, DOE-OAK
FFAs	Federal Facilities Agreements
FM	Financial Management, DOE-OAK
FSP(s)	Facility Safety Procedure(s)
HCD	Hazards Control Department, LLNL
HQ	Headquarters, DOE
HWMD	Hazardous Waste Management Division, Environmental Protection Department (LLNL)
LEDO	Laboratory Emergency Duty Officer
LEO	Laboratory Executive Officer
LLNL	Lawrence Livermore National Laboratory
LWRP	Livermore Water Reclamation Plant
MD	Management Directive
NEPA	National Environmental Policy Act
NFSC	Nuclear Facility Safety Committee
NFSO	Nuclear Facilities Safety Office
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NRC	National Response Center
ODCs	Ozone-depleting chemicals
ODIS	Onsite Discharge Information System
OMB	Office of Management and Budget
ORAD	Operations and Regulatory Affairs Division, Environmental Protection Department (LLNL)
PPG	Pollution Prevention Group
PPOA	Pollution-Prevention Opportunity Assessments
QA	Quality Assurance
QAMP	Quality Assurance Management Plan
QAP(s)	Quality Assurance Plan(s)
RAS	Radiation Analytical Sciences Section
RCRA	Resource Conservation and Recovery Act
SOP	Standard Operating Procedure
SMC	Senior Managment Council
TAGG	Tank Assessment and Guidance Group, ORAD
WLRD	Weapons, Lasers, and Reimbursables Division, DOE-OAK
WMD	Waste Management Division, DOE-OAK
UC	University of California

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Appendix A

LLNL Environmental Policy Statement
December 19, 1989

The environmental policy of the Lawrence Livermore National Laboratory is to conduct operations in a manner which preserves the quality of the environment. We will comply with the letter and the spirit of governmental regulations and orders. Environmental risks will be reduced to levels as low as reasonably achievable below allowable limits. We will strongly support waste minimization. Interactions with the general public will be characterized by openness and integrity. We will foster effective internal oversight and external oversight. We will be accountable. Environment, health and safety will have top priority.

Appendix B

Environmental Protection Policy Statement
San Francisco Operations Office
U.S. Department of Energy
January 29, 1990

It is the policy and practice of the U.S. Department of Energy (DOE) to conduct its operations in a safe and environmentally sound manner. Secretary Watkins has made it clear that protection of the public, the environment, and our employees is a responsibility of paramount importance at our facilities. In announcing a 10-point initiative to reinforce accountability in environment, safety, and health, Secretary Watkins stated, "The goal of the 10 initiatives I have announced today is to restore credibility to the DOE and to provide the kind of environmentally responsible direction that is critical to achieving the important national missions of the DOE." The San Francisco Operations Office (DOE-SAN) fully endorses all aspects of this 10-point initiative.

To accomplish this, it is the policy and practice of DOE-SAN to conduct our operations in compliance with the letter and spirit of environmental statutes, regulations, and standards. In addition, we are committed to good environmental management of all programs at our facilities and to correcting existing environmental problems before they pose a threat to the public welfare or to the environment. Consistent with the Secretary's goals, we are working with the appropriate offices of the State of California and the U.S. Environmental Protection Agency to implement DOE's Five-Year Plan to achieve environmental compliance and clean-up at sites for which DOE-SAN is responsible.

Our contractors must also share responsibilities for good environmental management. We expect our management and operating contractors to conduct facility operations in a manner that protects the public and employees' health and limits risk to the environment.

In addition, DOE-SAN will take the necessary management initiatives to reduce the generation of hazardous or radioactive wastes requiring disposal. As part of this program, DOE-SAN expects that all levels of facility management within DOE and our contractors shall encourage employee initiatives in pollution prevention and waste minimization and shall instill a pollution prevention ethic within the work place.

In the final analysis, reaching the goals that have been established by the Secretary will depend upon each and every employee's contribution as we strive to achieve environmental excellence at our facilities.

Appendix C

LLNL Director's Waste Minimization Policy

In February 1989, John H. Nuckolls, Director, LLNL issued the following statement on waste minimization:

> "It is important that the Laboratory make a strong commitment to waste minimization—to substantially reduce waste generation and increase recycling. Our goal is to achieve a significant overall reduction in the next few years. We plan to implement an incentive system where each Laboratory program will pay the costs associated with its wastes. Each program will also establish waste minimization goals and develop plans and assign responsibility for achieving these goals."

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